AF

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

APPEAL BRIEF FOR THE APPELLANT

Ex parte OHSHITA et al.

ORGANIC ELECTROLUMINESCENT DISPLAY DEVICE

Application Number: 10/620,354
Filed: July 17, 2003
Appeal No.:
Group Art Unit: 2879
Examiner: PERRY, Anthony

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In re the Appellant:	Appeal No.:
Isamu OHSHITA et al.	Group Art Unit: 2879
Application No.: 10/620,354	Examiner: Anthony PERRY
Confirmation No.: 8911	Attorney Docket No.: 107156-00193

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For: ORGANIC ELECTROLUMINESCENT DISPLAY DEVICE

APPEAL BRIEF

Date: **JUNE 4, 2007**

This is an appeal under 35 USC 134(a) and 37 C.F.R. § 1.191 to the Board of Patent Appeals and Interferences of the United States Patent and Trademark Office from the final rejection in the Office Action, made "Final", of January 5, 2007 of Claims 4-8 and 10-16 in the above-identified patent application. The Applicant's Brief on Appeal is filed with the requisite filing fee under 37 C.F.R. § 41.20(b)(2). This Brief on Appeal is being timely filed.

This brief contains these items under the following headings, and in the order set forth below (37 C.F.R. § 41.37(c)(1)):

I. Real Party in Interest
II. Related Appeals and Interferences
III. Status of Claims
IV. Status of Amendments
V. Summary of the Claimed Subject Matter
VI. Grounds of Rejection to be Reviewed on Appeal
VII. Arguments
VIII. Claims Appendix
IX. Evidence Appendix
X. Related Proceedings Appendix

The final page of this brief bears the practitioner's signature.

I. REAL PARTY IN INTEREST

The real party in interest in the present application is TOHOKU PIONEER CORPORATION, by assignment of this case from the inventors Isamu OHSHITA, Teruichi WATANABE, Gen SUZUKI, Kunizo OGOSHI and Teruo TOHMA. The assignment is recorded in the United States Patent and Trademark Office at Reel 016928, Frame 0653.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences known to the Appellant, Appellant's legal representative or Assignee which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

The status of the clams in this application are:

1. **Total Number of Claims in Application**

There were originally 15 claims pending in this application, numbered 1 to 15.

2. **Status of All of the Claims**

A. Claims cancelled: Four claims cancelled, Claims 1-3 and 9.
B. Claims withdrawn from consideration but not cancelled: None.
C. Claims pending: Twelve claims pending, Claims 4-8 and 10-16.
D. Claims allowed: None.
E. Claims objected to: None.
F. Claims rejected: Twelve claims rejected, Claims 4-8 and 10-16.
G. Claims added: One claim added, Claim 16.

3. **Claims on Appeal**

The claims on appeal are Claims 4-8 and 10-16.

IV. STATUS OF AMENDMENTS

The claims were last amended on October 10, 2006 at the time of the filing of the Response to the Office Action of May 19, 2006. The amendments have been entered in the case and are reflected in the current status of the claims.

No amendments have been filed subsequent to the rejection from which this appeal has been taken, contained in the Office Action, made "Final", of January 5, 2007.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

The sole independent claim on appeal, that is, Claim 16, recites "An organic electroluminescent display device comprising:

a plurality of pixels located above a substrate, each pixel being formed of two light-emitting elements and producing only two different colors of predetermined chromaticity values,

wherein each light-emitting element is formed by interposing a luminescent layer containing organic electroluminescent materials between a pair of electrodes, at least one electrode of the pair of electrodes comprises a plurality of independent array patterns corresponding to the light-emitting elements,

wherein a mixture of the two different colors produces colors falling within a line segment between two different colors by controlling each gradation of the two light-emitting elements in a CIExy chromaticity diagram,

wherein a part of the color falling within the line segment produce colors falling within a circular area of a 0.1 radius with a center in a pure white coordinate of 0.31, 0.36 in the CIExy chromaticity diagram, and

wherein the two light-emitting elements are driven by different electric currents or voltages to achieve a quasi-color display."

An example of the "organic electroluminescent display device is identified by the reference number 10 in Figure 1, for example, as discussed on page 17, line 7. "Pixels" P formed of two light-emitting elements (e.g., R: Red and B: Blue) and producing only two different colors of predetermined chromaticity values are formed above the "substrate" 11 as shown in Figures 4-5, for example, and as discussed on page 17, line 22 to page 18,

line 1; page 18, line 25 to page 19, line 8. Each of the light-emitting elements R and B are formed by interposing a luminescent layer 20, as shown in Figure 5, for example, and discussed on page 17, line 16 and page 18, line 9 to page 19, line 2, containing organic electroluminescent materials (e.g., first light-emitting layer 23R, electron transport layer 24R and electron injection layer 25R; or second light-emitting layer 24B, electron transport layer 24B and electron injection layer 25B) between a pair of electrodes as shown in Figure 5 and the discussion on page 18, lines 14-22, between the first display electrode 14 and the common, second display electrode 16, which form the recited "pair of electrodes". Figures 6(a) through 6(d) illustrate different examples of at least one of the two electrodes 14 and 16 including a "plurality of independent array patterns" that correspond to the light-emitting elements R, B. See page 16, lines 7-9; page 22, lines 3-21 and page 22, line 22 through page 23, line2 of the disclosure. The CIE chromaticity of each emitted color is set to a desired value by selecting dopant materials or their concentration in the light-emitting layers 23R, 23B. See page 19, lines 6-8 of the discussion. By mixing the two colors, other colors can be produced. See page 20, lines 2-6. Looking to an exemplary embodiment illustrated in figure 7, by controlling the gradation of the light-emitting elements R, B, a mixture of the two different colors can produce colors on a line segment between E_{R1} and E_{B1}, which are then displayed on the inventive display device 10, as is discussed on page 24, lines 6-8. A part of the color falling within the line segment produces colors falling within a circular area of a 0.1 radius with a center in a pure white coordinate of 0.31, 0.36 in the CIExy chromaticity diagram, as is shown in Figure 7 and discussed on page 20, lines 2-6 and 16-21; and 21, lines 17-20, for example. Then, by driving the light-emitting elements R, B with

different electric currents or voltages, a quasi-color display is achieved, as is discussed on page 15, lines 6-10; page 23, lines 3-9; and page 24, lines 6-21.

In essence, the claimed subject matter relates to an organic electroluminescent display device having a plurality of pixels located above a substrate wherein the pixels are each formed of two light-emitting elements that are formed by interposing a luminescent layer containing organic electroluminescent materials between a pair of electrodes that are located above the substrate. As is clear from the above mapping of Claim 16, one example of the display device is illustrated in Figures 4-7.

The display device 10 includes a substrate 11 on which a first display electrode 14 is provided. The first display electrode 14 is comprised of independent array patterns, each pattern corresponding to light-emitting elements R and B. Each pixel P of a plurality of pixels P is composed of the light-emitting elements R and B (see Figure 4). As shown in Figure 5, each of the light-emitting elements R and B is formed by interposing a luminescent layer 20 that is made up of a light emitting layer 23R or 24B, an electron transport layer 24R or 24B, and an electron injection layer 25R or 25B.

The CIE chromaticity of each emitted color is then set to a desired value by selecting either the dopant materials or their concentrations in the light-emitting layers 23R and 23B. Hence, by controlling the gradation of the two light-emitting elements R and B in the CIExy chromaticity diagram, and by mixing the two colors produced by the light-emitting elements R and B, a color is produced which falls with a line segment between two different colors. A part of the color falling within the line segment produces colors falling within a circular area of a 0.1 radius with a center in a pure white coordinate of 0.31, 0.36 in the CIExy

chromaticity diagram (see Figure 7). A quasi-color display is then achieved by driving the light-emitting elements R and b using different electric currents or voltages.

As is clear from above, the claimed invention provides a display device that provides a picture in quasi-color (that is, close to being a full color picture), so that it is necessary to ensure that at least one of the pair of the electrodes includes a plurality of independent array patterns that correspond to the light-emitting elements. As illustrated in Figure 5, the first display electrode of the light emitting elements R and B are independently formed so that it is possible to form a multicolor picture by controlling the gradation of each of the R and B light emitting elements independently of (see page 17, lines 24-25 of the specification). Furthermore, it becomes possible for a mixture of two different colors to produce colors falling within a line segment between two different colors by controlling each gradation of the two light-emitting elements in the CIExy chromaticity diagram, and it is also possible for a part of the colors falling within the line segment to produce colors falling within a circular area of a 0.1 radius with a center in a pure white coordinate of 0.31, 0.316 in the CIExy chromaticity diagram.

As noted in the *Background of the Invention* section of the instant application, the related art suffers from the drawback where in a conventional display device where the display unit is made up of three light-emitting elements, a ratio of luminescent area per pixel is low because non-luminescent margins for wiring are present around the light-emitting elements. Further, such a display requires a complex manufacturing process that is attributed to the need for the three light-emitting elements to be formed one by one on the substrate.

Another conventional display device uses two light-emitting diodes of different colors per pixel that provide multicolour images by mixing the two gray-scaled colors. However, this conventional display device is difficult to precisely control the chromaticity of the emitted light and as such, high-quality, two-color images are not provided due to the rather limited chromaticity range attained by mixing LED colors.

Appellants display device overcomes at least the drawbacks of the above described conventional display devices.

Appellants respectfully submit that although specific exemplary page and line numbers have been given in parentheses, above, the application is replete with supporting material for all of the presently pending claims, both in the text and in the illustrations.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 4-8 and 10-16 are rejected under 35 U.S.C. § 103(a) as being unpatenable over U.S. Patent Publication No. 2002/0070663 to Ogura et al. (Ogura) in view of U.S. Patent No. 6,628,067 to Kobayashi et al. (Kobayashi) and further in view of U.S. Patent No. 6,498,592 to Matthies.

VII. ARGUMENTS

(A) Grouping of Claims

The claims under appeal include independent Claim 16 . The claims do not necessarily all rise or fall together.

(B) Rejections Under 35 U.S.C. §102 - Anticipation

There are no claims that stand rejected under 35 USC 102 at present.

(C) Claim Rejections Under 35 U.S.C. §103 - Obviousness

1. Statement of the Law

Several basic factual inquiries must be made to determine obviousness or non-obviousness of patent application claims under 35 U.S.C. § 103. These factual inquiries are set forth in Graham v. John Deere Co., 383 U.S. 1, 17, (1966):

> Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; the level of ordinary skill in the pertinent art resolved. Against this backdrop, the obviousness or non-obviousness of the subject matter is determined.

Appellants respectfully submit that the specific factual inquiries set forth in *Graham* have not been considered or properly applied by the Examiner formulating the rejection of the pending claims. Particularly the differences between the prior art and the claims were not properly determined. As stated by the Federal Circuit in In re Ochiai, 37 U.S.P.Q. 2d 1127, 1131 (Fed. Cir. 1995):

> [t]he test of obviousness *vel non* is statutory. It requires that one compare the claim's subject matter as a whole with a prior art to which the subject matter pertains. 35 U.S.C. § 103.

> The inquiry is highly fact-specific by design.... When the references cited by the Examiner fail to establish a *prima facie* case of obviousness, the rejection is improper and will be overturned. In re Fine, 837 F.2d 1071, 1074, 5 U.S.P.Q. 2d 1596, 1598 (Fed. Cir. 1988). (Emphasis added.)

When rejecting claims under 35 U.S.C. §103, an Examiner bears an initial burden of presenting a prima facie case of obviousness. If an Examiner fails to establish a prima facie case, the rejection is improper and will be overturned. See: In re Rijckaert, 9 F.3d 1531, 1532, 28 U.S.P.Q. 2d. 1955 (Fed. Cir. 1993). "If examination.... does not produce a prima facie case of unpatentability, then without more the applicant is entitled to the grant of the patent." In re Oetiker, 977 F.2d 1443, 1445 – 1446, 24 U.S.P.Q. 2d. 1443, 1444 (Fed. Cir. 1992).

Moreover, it is well established that "[i]f an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious." In re Fine, 837 F.2d 1071, 1076, 5 USPQ2d 1596 (Fed. Cir. 1988).

Appellants respectfully submit that the Examiner has not made a proper *prima facie* rejection under 35 U.S.C. §103(a), because the combination of prior art references cited fails to teach or suggest the present invention as recited in Claim 16 and because it would not be obvious to combine the cited references.

Claims 4-8 and 10-16 were improperly rejected under 35 U.S.C. §103(a) as being unpatentable over Ogura in view of Kobayashi and further in view of Matthies.

In the Office Action dated January 5, 2007, Claims 4-8 and 10-16 were rejected under 35 U.S.C. §103(a) as being unpatentable over Ogura in view of Kobayashi and further in view of Matthies.

In making this rejection, the Office Action asserts that Ogura shows most, i.e., not all, aspects of the claimed invention. For example, by pointing to Figure 9 and paragraph [00168], the Office Action states that Ogura shows a passive matrix light emitting device having a plurality of pixels located above a substrate (1001), wherein each pixel is formed by two light emitting elements that produce only two different colors of predetermined chromaticity values. The Office Action notes that Ogura teaches the light-emitting elements are formed by positioning a luminescent layer (1004) between opposing electrodes (1002) and (1006).

The Office Action, by citing Figure 6 and paragraphs [0166] to [0168], states that Ogura teach that at least one of the electrodes (1002) or (1006) comprises a plurality of independent array patterns that correspond to the light-emitting elements. Appellants respectfully submit that paragraphs [0166] to [0168] teach nothing about the electrodes (1002) and/or (1006) including a plurality of independent array patterns. Rather, Appellants submit that paragraph [0166] merely states that the cathode (1006) or electrode can be arranged in a stripe shape in a vertical direction to the page, which has nothing to do with the cathode or electrode (1006) having or including a plurality of independent array patterns. Paragraph [0167] merely discusses how the electroluminescent layers (EL) (1004a to 1004c) are fabricated and then arranged with no discussion whatsoever as to the electrodes (1002) and/or (1006) having or including a plurality of independent array patterns. Finally, paragraph [0168], as cited by the Office Action, merely teaches that the

passive light emitting device can include a plurality of colors, but is totally silent as to the electrodes (1002) and/or (1006) having or including a plurality of independent array patterns. As for the teachings of Figures 6A and 6B of Ogura, Appellants note that Figures 6A and 6B merely teach the process of manufacturing a pixel TFT and driver circuit TFT and do not teach or otherwise illustrate an electrode having or including a plurality of independent array patterns that correspond to light-emitting elements.

Appellants note that the Office Action admits that Ogura does not teach two different colors are mixed to produce a white color or that the different colors are driven by a different current or voltage.

Appellants submit that Ogura fails to teach anything about a chromaticity diagram and any control of gradation of light-emitting elements having predetermined chromaticity values. Appellants submit, again, two pictures that are provided in the Appendix, wherein one picture was produced by the display device of the claimed invention, and which provides an image very close to a full color picture, and wherein the other picture was produced using a conventional display device (such as the one disclosed by Ogura), and which provides an image that is not a color picture to illustrate the difference in quality of the image produced .

The Office Action cites Kobayashi for teaching that is well known in the industry that blue and yellow organic lights can be used in combination to form an organic EL white light source that has CIE coordinates. As such, the Office Action asserts it would have been obvious to one of ordinary skill in the art to which the claimed invention pertains to provide the two light-emitting elements emitting blue and yellow light with different emissive areas

so that they can be operated at the same time to produce a white light source having an excellent CIE value.

Appellants concede that Kobayashi indeed discloses a mixture of blue and yellow light. However, Appellants respectfully submit that Kobayashi merely teaches that the mixture of blue and yellow light produces a white light that is used for illumination or backlighting because using Kobayashi's common anode (2) and common cathode (6) fails to control gradations of blue and yellow light emission elements.

Even is such a feature of controlling gradation is not given patentable weight, controlling the gradation of two light-emitting elements is not the same as picking colors for a display as asserted by the Office Action. Put simply, choosing the blue and yellow colors for the display merely requires selecting a color while controlling the gradation of two light-emitting elements requires controlling a change in color, which requires a higher degree of technical acumen and skill versus picking a color, which is typically well within a designer's choice.

Finally, even if the above arguments are not deemed persuasive, Appellants note that Kobayashi, as asserted by the Office Action, discloses a chromaticity of (0.31, 0.35) in obtaining a white light, which is near the recited pure white coordinate of (0.31, 0.36). However, Kobayashi fails to teach or remotely suggest that a part of the colors falling within such a line segment produces colors falling within ***a circular area of a 0.1 radius*** with a center in a pure white coordinate (0.31, 0.36), which is recited in Claim 16. In fact, Appellants note the Office Action is completely silent as to any consideration of this recited feature. Put simply, at the very least, Ogura and Kobayashi fail to (i.e., do not) teach or suggest any portion of the color emitted by their devices, either alone or in combination,

falls within a line segment that produces colors falling within ***a circular area of a 0.1 radius*** with a center in a pure white coordinate of 0.31, 0.36 in a CIExy chromaticity diagram.

As noted above, the Office Action admits that Ogura fails to teach different colors being driven by different currents or different voltages. The Office Action also admits that Kobayashi fails to teach such a feature as well. To cure the deficiency of Ogura and Kobayashi, the Office Action cites Matthies. In particular, the Office Action asserts that Matthies teaches an organic electroluminescent display device comprising a plurality of light emitting elements that are formed of different color light emitting films driven by different currents and different voltages. Appellants respectfully disagree with the assertion as to what Matthies supposedly teaches.

Specifically, Appellants submit that Matthie merely teaches that different voltages V0, V2 are applied to pixels at different times T0, T2. As such, Matthies fails to teach that two light-emitting elements are driven by different electric currents or different voltages for achieving a quasi-color display.

Furthermore, Appellants submit that Matthies, like Ogura and Kobayashi, fails to teach or suggest any portion of the color emitted by their devices, either alone or in combination, falls within a line segment that produces colors falling within ***a circular area of a 0.1 radius*** with a center in a pure white coordinate of 0.31, 0.36 in a CIExy chromaticity diagram.

Accordingly, Appellants respectfully submit that the art of record, i.e., Ogura, Kobayashi and Matthies, alone or in any combination, fails to teach or suggest the features recited by Claim 16, such as, for example and not limited to the reason that, Ogura, Kobayashi and Matthies each fail to teach or suggest any portion of the color emitted by

their devices, either alone or in combination, falls within a line segment that produces colors falling within ***a circular area of a 0.1 radius*** with a center in a pure white coordinate of 0.31, 0.36 in a CIExy chromaticity diagram. Therefore, Appellants respectfully submit that the Office Action has failed to establish a prima facie case of obviousness and the rejection of Claim 16 is improper. Moreover, Appellants respectfully submit that one of ordinary skill in the art would not deem it obvious to modify Ogura according to the teachings of Kobayashi and/or Matthies because to do so would not arrive at the invention recited by Claim 16.

Consequently, the combination of Ogura, Kobayashi and Matthies fails to teach and/or suggest the claimed invention recited in Claim 16. Claims 4-8 and 10-15 depend, directly or indirectly, from Claim 16. Therefore, Appellants respectfully submit that Claims 4-8 and 10-16 were improperly rejected under 35 U.S.C. §103(a) and are patentable over the combination of Ogura, Kobayashi and Matthies.

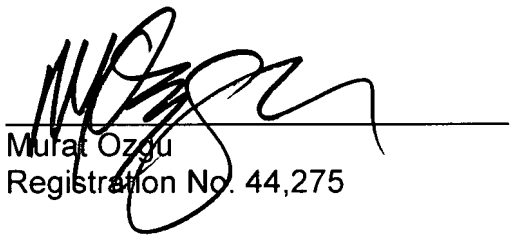
Conclusion

For all of the above-noted reasons, it is strongly contended that clear differences exist between the present invention recited in Claims 4-8 and 10-16 and the prior art asserted by the Office Action. It is further contended that these differences are such that the present invention would not have been obvious to a person having ordinary skill in the art at the time the invention was made.

This final rejection being in error, therefore, it is respectfully requested that this Honorable Board of Patent Appeals and Interferences reverse the Examiner's decision in this case and indicate the allowability of Claims 4-8 and 10-16.

In the event that this paper is not considered timely filed, applicants respectfully petition for an appropriate extension of time. Any fees for such extension, together with any additional fees which may be due with respect to this paper, may be charged to our Deposit Account No. 01-2300, making reference to attorney docket number 107156.00193.

Respectfully submitted,



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Enclosures: Appendix 1 – Claims on appeal; Appendix 2 - Evidence

VIII. CLAIMS APPENDIX

Claims 1-3 (**Canceled**).

4. (**Previously Presented**) The organic electroluminescent display device according to claim 16, wherein said two different colors are selected from red (R), green (G), blue (B), cyan (C), magenta (M) and yellow (Y).

5. (**Previously Presented**) The organic electroluminescent display device according to claim 16, wherein one of said two different colors is white and the other is one selected from red (R), green (G), blue (B), cyan (C), magenta (M) and yellow (Y).

6. (**Previously Presented**) The organic electroluminescent display device according to claim 16, wherein said chromaticity values of two different colors are controlled by changing a concentration ratio of said organic electroluminescent materials or by coupling with a foreign material.

7. (**Previously Presented**) The organic electroluminescent display device according to claim 16, wherein said chromaticity values of two colors are controlled by changing thickness of a light-emitting film.

8. (**Previously Presented**) The organic electroluminescent display device according to claim 16, wherein said light-emitting elements are fabricated by a photo bleaching process applied to a light-emitting film.

Claim 9 (**Cancelled**).

10. (**Previously Presented**) The organic electroluminescent display device according to claim 16, wherein each said light-emitting element is formed corresponding to every color filter which converts a color of light emitted from a light-emitting film, respectively.

11. (**Previously Presented**) The organic electroluminescent display device according to claim 16, wherein each said light-emitting element is formed corresponding to every luminescent color conversion filter which converts a color of light emitted from a light-emitting film, respectively.

12. (**Previously Presented**) The organic electroluminescent display device according to claim 16, wherein a light-emitting film is formed by a coating method or a printing method.

13. (**Previously Presented**) The organic electroluminescent display device according to claim 16, wherein said two different color light-emitting elements have different emissive areas based on each lifetime of said light-emitting elements.

14. (**Previously Presented**) The organic electroluminescent display device according to claim 16, wherein said light-emitting element is driven by an electric current of a different level for each color.

15. (**Previously Presented**) The organic electroluminescent display device according to claim 16, wherein said light-emitting element is driven by a voltage of a different level for each color.

16. (**Previously Presented**) An organic electroluminescent display device comprising:

a plurality of pixels located above a substrate, each pixel being formed of two light-emitting elements and producing only two different colors of predetermined chromaticity values,

wherein each light-emitting element is formed by interposing a luminescent layer containing organic electroluminescent materials between a pair of electrodes, at least one

electrode of the pair of electrodes comprises a plurality of independent array patterns corresponding to the light-emitting elements,

wherein a mixture of the two different colors produces colors falling within a line segment between two different colors by controlling each gradation of the two light-emitting elements in a CIExy chromaticity diagram,

wherein a part of the color falling within the line segment produce colors falling within a circular area of a 0.1 radius with a center in a pure white coordinate of 0.31, 0.36 in the CIExy chromaticity diagram, and

wherein the two light-emitting elements are driven by different electric currents or voltages to achieve a quasi-color display.

IX. EVIDENCE APPENDIX

Two pictures produced by the present invention and prior art for comparison.

Two pictures produced by the present invention and prior art for comparison

(produced by the display device of the present invention

(produced by a conventional (such as Ogura) display device

X. RELATED PROCEEDINGS APPENDIX

There are no related proceedings.